

Docee River Counting Fence 1987 Operations

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ABSTRACT

Bachen, S.K., B.L. Thomson and R.D. Goruk. 1988. Docee River counting fence. 1987 Operations. Can. Data Rep. Fish. Aquat. Sci. 704:iv + 16 p.

The Docee River counting fence has been in operation on the Docee River, Central Coast, B.C., since 1972. Salmon escapement data collected at the fence provides inseason estimates of escapement to managers operating the Smith Inlet sockeye fishery. Sockeye age, length and sex statistics are collected as part of the enumeration program. In 1987 193,781 sockeye salmon were counted through the fence. From a sample of 84 fish, 15% were age 42 and 79% age 52. Although early returning fish were predominantly female, the sex ratio was approximately 1:1 by the end of the season. General repairs required to the fence to maintain fence performance and to the field camp for personnel safety are identified.

RESUME

Bachen, S.K., B.L. Thomson and R.D. Goruk. 1988. Docee River counting fence. 1987 Operations. Can. Data Rep. Fish. Aquat. Sci. 704:iv + 16 p.

La barrière de dénombrement de la rivière Docee, dans la zone côtière centrale de Colombie-Britannique, est en service depuis 1972. Les données sur les échappées de saumon recueillies à la barrière fournissent des estimations pour la saison en cours aux gestionnaires chargés de la pêche de saumon rouge de l'inlet Smith. Le programme de dénombrement permet aussi de recueillir des statistiques sur l'âge, la longueur et le sexe des saumons. En 1987, 193 781 saumons rouges ont été dénombrés à la barrière. Sur un échantillon de 84 poissons, 15 % étaient d'âge 42 et 79 % d'âge 52. Les poissons qui revenaient les premiers étaient en majorité des femelles, mais le rapport des sexes atteignait environ 1:1 à la fin de la saison. Les auteurs signalent des réparations jugées nécessaires, d'une part à la barrière pour préserver son bon fonctionnement, d'autre part au camp pour assurer la sécurité du personnel.

INTRODUCTION

Smith Inlet (Canadian Department of Fisheries and Oceans, Statistical Area 10) is situated in the southern portion of the Central Coast of British Columbia (Figure 1). The Docee is a short river (<1 km long) draining Long Lake into Wyclees Lagoon which then flows into Smith Inlet. The Docee River counting fence is located at the head of Docee River at the lake outlet (Figures 1 and 2).

The Docee River counting fence has been used since 1972 to monitor sockeye escapement into Long Lake. The enumeration program provides inseason estimates of escapement to managers operating the Smith Inlet sockeye fishery. The counting fence operates from late June until August 8th.

METHODS

DOCEE RIVER COUNTING FENCE 1987

In 1987, the Docee Fence Camp was opened on June 17. The camp had not sustained any damage during the unoccupied time. The river above the fence was clear of major log jams, and the water level a little above normal.

1987 Camp Preparations

In Wyclees Lagoon, there has been no float to moor boats at the bottom of the skidder road for the past two years. This year a float was constructed and secured to the existing standing boom. A ramp was also constructed connecting the float to the beach.

The skidder road and trail leading to the camp were cleared of alder and salmon berry bush to within 200 yards (180 m) of the lagoon.

Winter storms and high water destroyed the shearboom and aircraft float located above the fence. The shearboom stops debris from collecting on the fence. A new shearboom was constructed from logs beachcombed along the lake shore, and tied together with 3/4" (1.9 cm) cable. The new shearboom was in place by June 22nd. A new aircraft float was constructed and secured to the shearboom during the season.

The sixteen (16) fence panels were serviced and the frames lowered on June 26. Sand bags were used to plug the major holes along the bottom of the panels. Under some of the panels, up to 25 sand bags were required to plug the holes. Some of the holes between the frames have been plugged with 4'x 8' (10 cm x 20.3 cm) pieces of expanded metal.

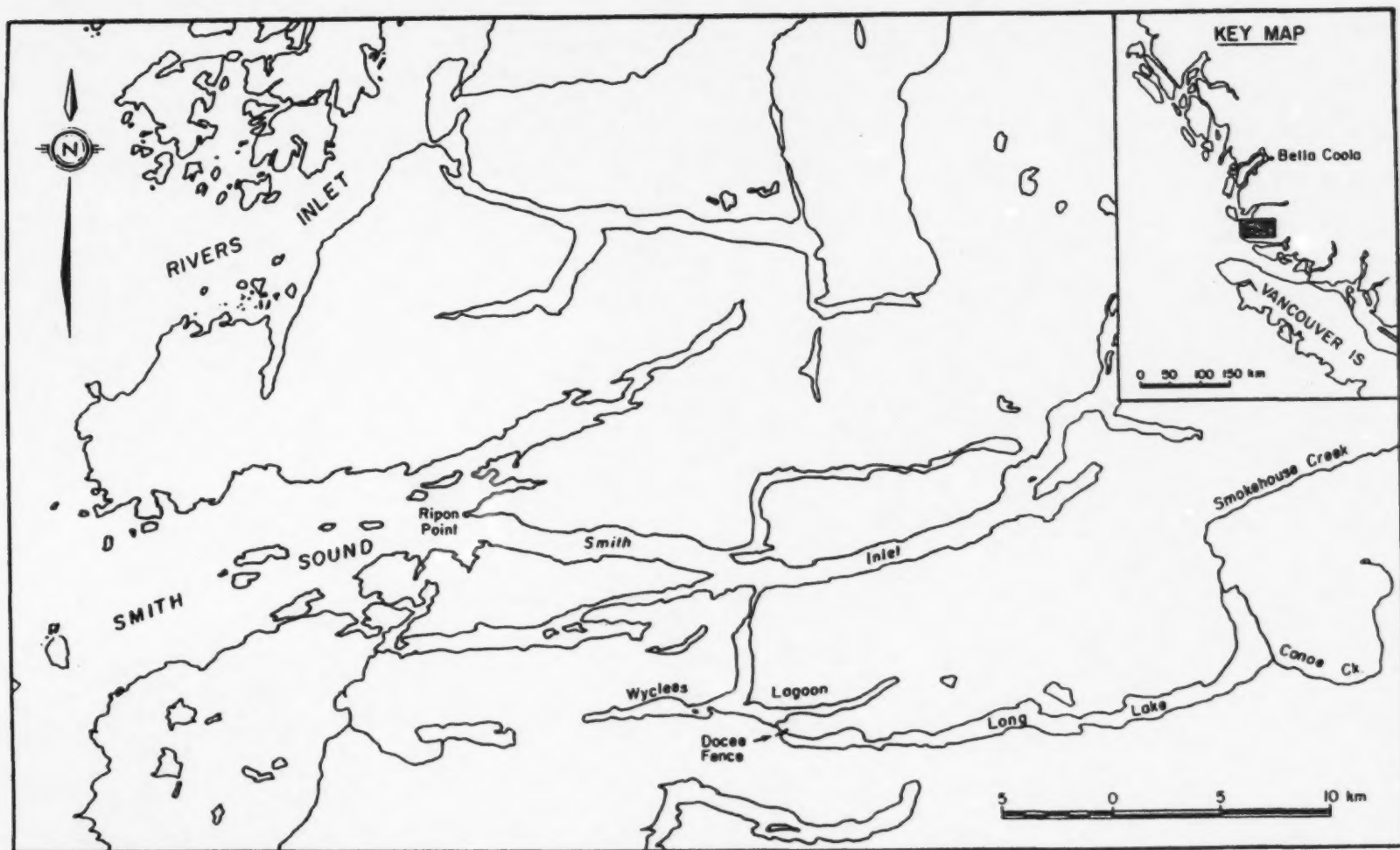


FIGURE 1. Location of Docee River, Smith Sound.

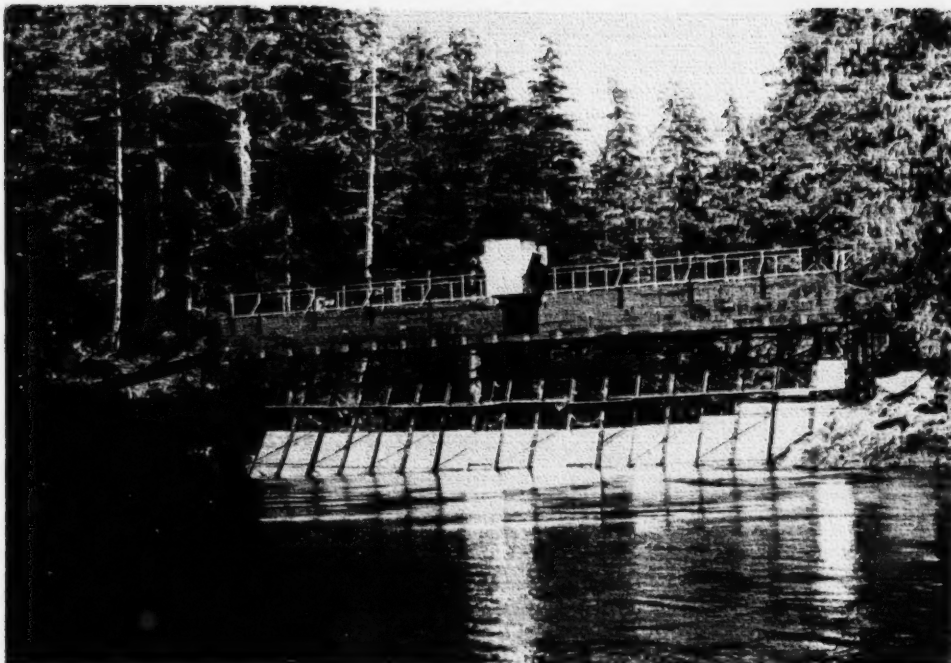


FIGURE 2. Docee River fence.

1987 Fence Operation

The fence was operating by 16:30 June 26. Daily river levels and weather patterns throughout the survey period are detailed in Table 1 (Figure 3). July 6 was the first day with a daily sockeye count over 1000. The fish arrived rather slowly at first, with peak counts of 17,524 sockeye on July 14, and 47,933 on July 27. After July 29, the count dropped rapidly (Table 2, Figure 4). The first chinook was counted through the fence on July 26. By August 8, the chinook count totalled 17 though a fair number were still holding in the eddy below the fence. A few coho were observed on the last days of the fence operation. The fence was pulled on August 8, 1987. The total sockeye counted through the fence in 1987 was 193,781.

Figure 5 shows the cumulative sockeye count through the fence. The episodic escapements through the fence are generally considered to be attributable to the Area 10 commercial sockeye fisheries held during the previous week in Smith Inlet. This year, major fisheries having daily catch averages ranging from 17-35,000 sockeye were held July 5-7, July 12-14 and July 19-20. The total Area 10 sockeye catch for 1987 was 162,803 fish. The total escapement of sockeye into Long Lake for 1987 was estimated at 200,000. Thus, the total estimated run size of the sockeye stock returning to Area 10 in 1987 is 362,803.

Table 3 shows the age, sex and length characteristics of sockeye sampled at the fence in 1987. Though the sex ratio of the samples was 1:1, Figure 6 shows that the run composition switched from being predominantly female at the start of July to being predominantly male by the month's end. Seventy-nine percent of the samples of known age were age 52. Figure 7 showing the age samples taken by date, indicates that other age classes were not significantly present until towards the end of the run. A complete summary of the biological sampling data is presented in Appendix I.

1987 Trap Operation

The traps on the fence worked better this year than in 1986. The sides and bottoms were covered with plywood to decrease the water turbulence. A piece of plywood placed in front of the traps was left loose, allowing it to be moved up or down to control the water flow and the turbulence. Although this worked quite well, the traps still do not catch sockeye in the manner originally anticipated. When large build-ups of fish behind the fence occurred, the maximum number of fish caught at any one time was two (2), and in an hour, five (5). The fish are wary of entering the traps, and will back out almost immediately. Reducing the water turbulence by enclosing the trap sides and bottom may make the traps fish more efficiently.

Coho appear to be the easiest species to catch in the traps. The first coho was caught on July 19.

TABLE 1. Docee River 1987. Daily weather and river levels.

DATE	RIVER LEVEL (M)		WEATHER
	AM	PM	
JUNE 17			Sun, warm, W
JUNE 18			AM-sun, W PM-sun, hot, strong W
JUNE 19			AM-sun, clouds PM-W
JUNE 20			Rain
JUNE 21			Rain SE
JUNE 22			AM-cloudy, rain PM- SE
JUNE 23			AM-sun, hot PM-sun, hot, W
JUNE 24			Sun, hot
JUNE 25	1.34	1.33	Sun
JUNE 26	1.33	1.25	Sun
JUNE 27	1.28	1.28	AM-fog PM-sun
JUNE 28	1.28	1.28	AM-fog PM-sun, clear
JUNE 29	1.33	1.33	AM-fog PM-sun, clear
JUNE 30	1.37	1.40	AM-fog PM-sun, clear
JULY 01	1.43	1.42	AM-fog PM-sun, clear
JULY 02	1.45	1.42	Fog
JULY 03	1.42	1.37	AM-fog,overcast PM-sun, some cloud
JULY 04	1.37	1.33	Overcast, light rain
JULY 05	1.31	1.26	AM-overcast, drizzle PM-overcast
JULY 06	1.22	1.19	AM-overcast PM-overcast, light rain
JULY 07	1.16	1.20	AM-light rain PM-overcast
JULY 08	1.22		Cloudy
JULY 09	1.16	1.08	Sun
JULY 10	1.08	1.04	AM-sun PM-overcast
JULY 11	1.04	1.01	AM-overcast PM-sun
JULY 12	1.01	0.99	Sun
JULY 13	0.99	0.98	AM-fog, calm PM-clear, sun, fog 1900hr
JULY 14	0.98	0.98	AM-overcast, clear 0800hr
JULY 15	0.96	0.88	Clear, sun
JULY 16	0.88	0.85	Clear, sun
JULY 17	0.84	0.82	Clear, sun AM-calm PM-strong NW
JULY 18	0.82	0.82	AM-sun, clear, light NW PM-sun
JULY 19	0.81	0.79	AM-light fog, clear 0730hr PM-fog 1700hr
JULY 20	0.81		Fog, overcast
JULY 21	0.81	0.81	Sun, fog 2000hr
JULY 22	0.81	0.81	AM-fog mist PM-clear, NW 15, Fog 2100hr
JULY 23	0.81	0.81	AM-fog, clear 1230hr PM-sun
JULY 24	0.81	0.81	AM-fog, clear 1230hr PM-sun, fog 1930hr
JULY 25	0.81	0.82	Overcast AM- light rain
JULY 26	0.82	0.81	AM-fog, overcast PM-rain 2100hr
JULY 27	0.82	0.87	AM-rain PM-cloud, rain
JULY 28	0.91	0.90	Cloudy, sunny breaks
JULY 29	0.90	0.90	Cloud PM-some sun
JULY 30	0.90		Cloudy, sunny breaks
JULY 31	0.85	0.85	AM-cloud, sunny breaks PM-sun, some cloud
AUG 01	0.82	0.78	AM-fog, clear 0830hr PM-sun, hot
AUG 02	0.76	0.72	AM-fog, clear 1230hr PM-sun
AUG 03	0.70	0.70	Overcast AM-light rain PM-some sun
AUG 04	0.69	0.69	AM-Fog PM-Sun, hot
AUG 05	0.67	0.67	Fog
AUG 06	0.66		AM-fog PM-sun
AUG 07	0.64	0.64	AM-fog PM-sun, hot
AUG 08	0.64	0.73	

**Fence in June 26 PM, Fence out August 8 PM

FIGURE 3. 1987 DOCEE RIVER

MORNING WATER LEVELS (M)

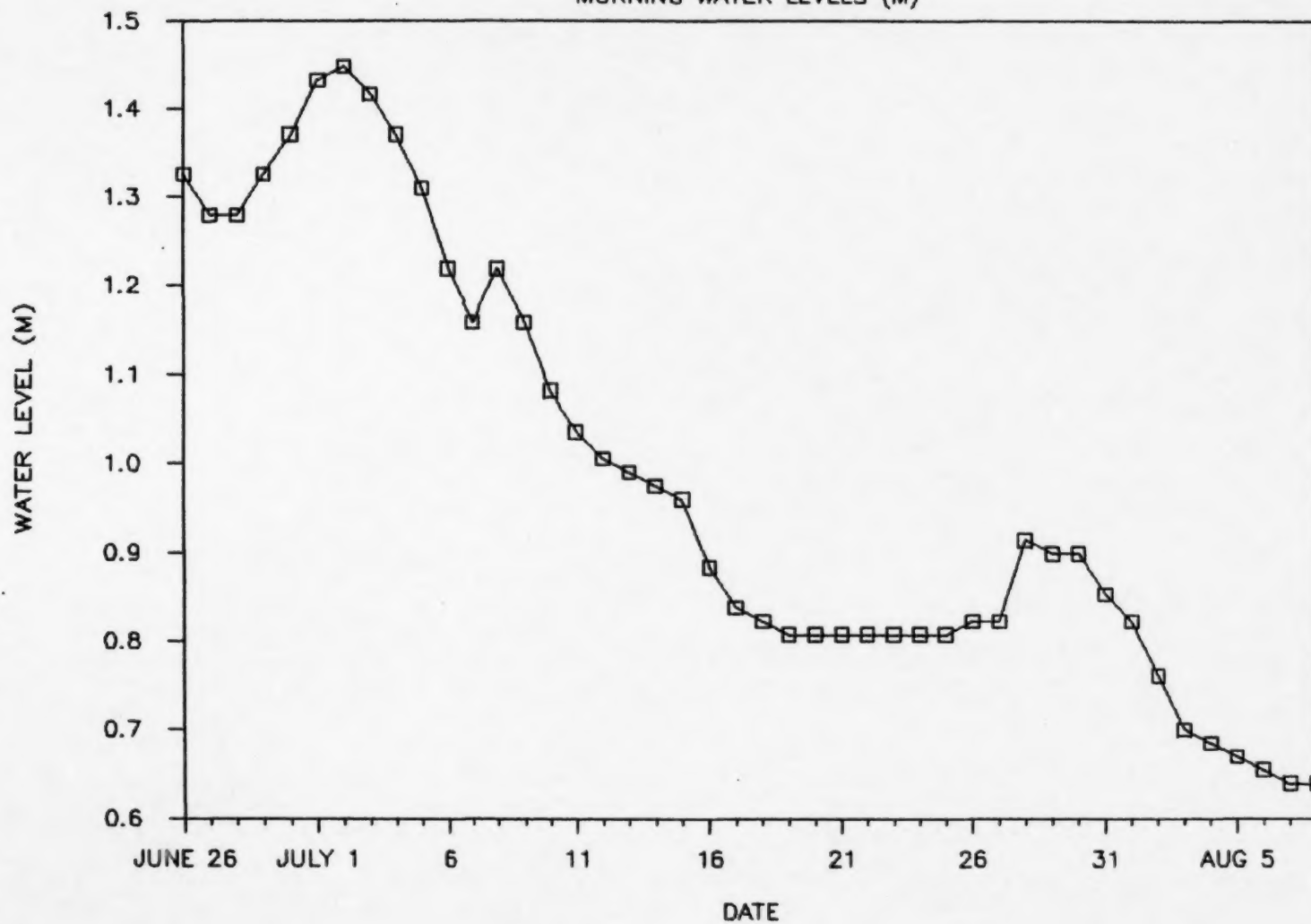


TABLE 2. 1987 Docee River Fence- Daily Counts

DATE	DAILY		CUMULATIVE		COMMENTS
	#SOCKEYE	#CHINOOK	#SOCKEYE	#CHINOOK	
JUNE 26	3		3	0	FENCE IN AT 1630 HRS
27	2		5	0	
28	10		15	0	
29	6		21	0	
30	3		24	0	
JULY 1	22		46	0	
2	7		53	0	
3	29		82	0	
4	8		90	0	
5	177		267	0	
6	1374		1641	0	
7	5022		6663	0	
8	906		7569	0	
9	321		7890	0	
10	71		7961	0	
11	48		8009	0	
12	55		8064	0	
13	7568		15632	0	
14	17524		33156	0	
15	9763		42919	0	1 SEAL
16	4340		47259	0	
17	1814		49073	0	
18	150		49223	0	
19	65		49288	0	1 SEAL
20	34		49322	0	
21	16		49338	0	
22	54		49392	0	1 SEAL
23	47		49439	0	
24	18		49457	0	
25	29574		79031	0	
26	26232	1	105263	1	
27	47933	4	153196	5	
28	29206	5	182402	10	
29	8064		190466	10	
30	829	1	191295	11	
31	585	1	191880	12	
AUG 1	702	3	192582	15	
2	393		192975	15	
3	347		193322	15	
4	149		193471	15	
AUG 5	98		193569	15	
6	101	2	193670	17	
7	51		193721	17	
8	60		193781	17	FENCE PULLED

FIGURE 4. 1987 DOCEE RIVER

DAILY SOCKEYE COUNTS

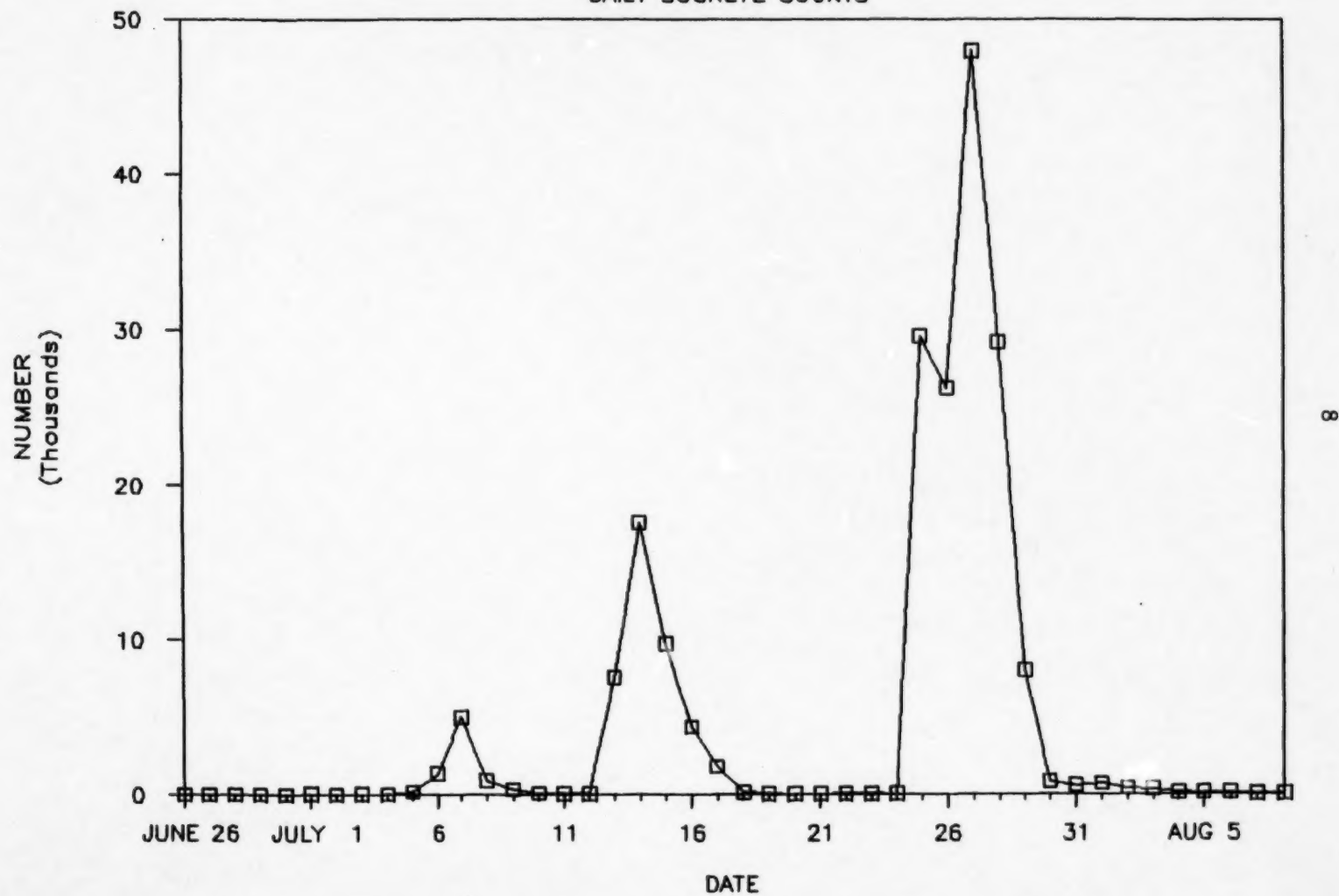


FIGURE 5. 1987 DOCEE RIVER

CUMULATIVE SOCKEYE COUNTS

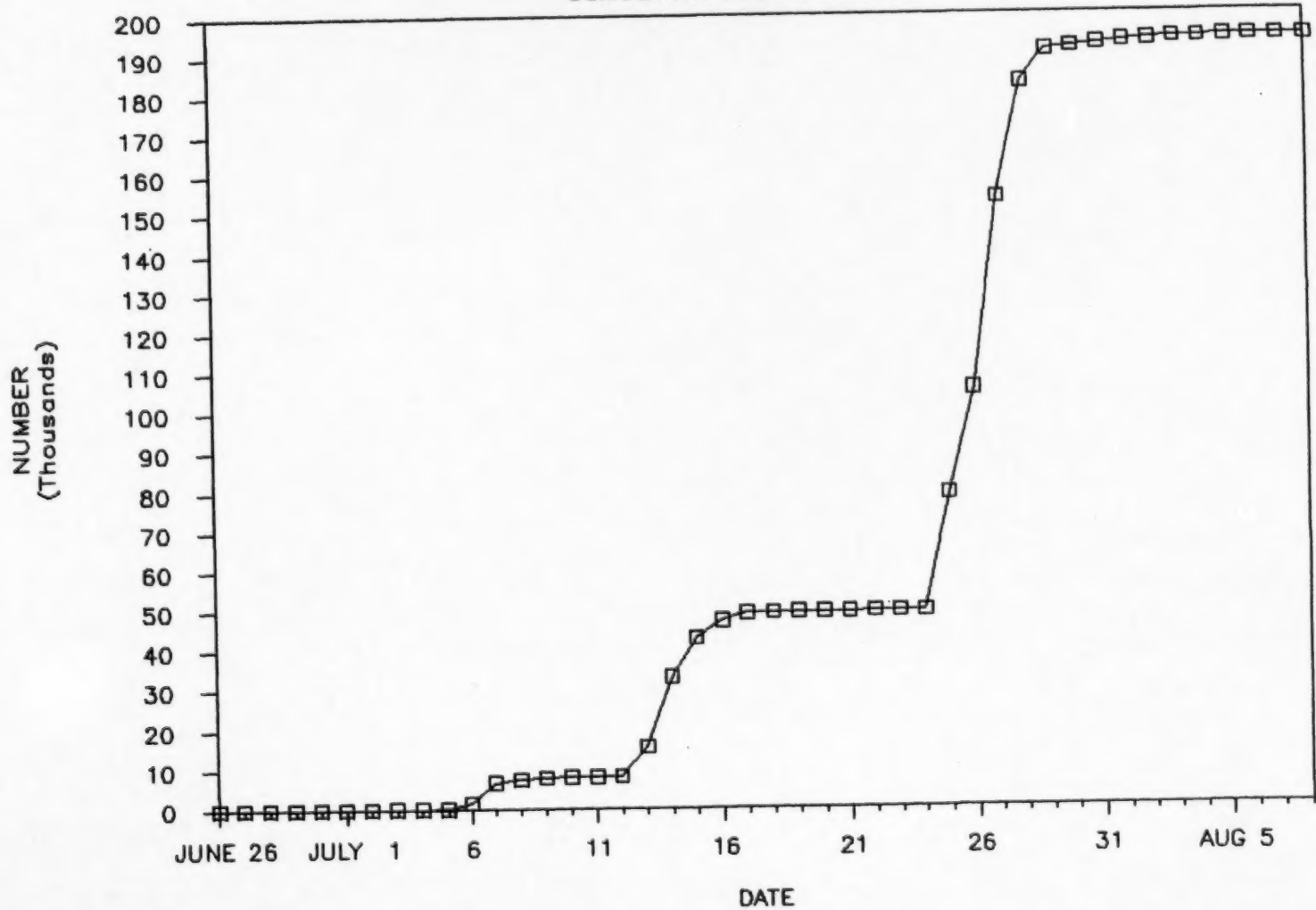


TABLE 3. Age, sex and length of sockeye salmon sampled from the Docee River Fence 1987.

Hypural Length (cm)	Age							
	Unknown		4 ₂		5 ₂		5 ₃	6
	M	F	M	F	M	F		
60								
59								
58								
57					1			
56						1		
55					3			
54	1				5	4		
53	3	3			7	6		
52	2				5	12		
51	1	2			4	5		
50					1	6		
49	1					5		
48	1							
47			2			1	1 ^M	1 ^M
46			2				1 ^M	1 ^M
45			1				1 ^M	
44			2	2				
43		1	4					
42								
41								
40								
TOTAL N	9	6	11	2	26	40	3	2

Total Sampled : 99

Total Aged : 84

Age Distribution (Percent)

Age 4₂ : 15%

Age 5₂ : 79%

Other : 6%

FIGURE 6. 1987 DOCEE RIVER

SOCKEYE SEX BY SAMPLING DATE

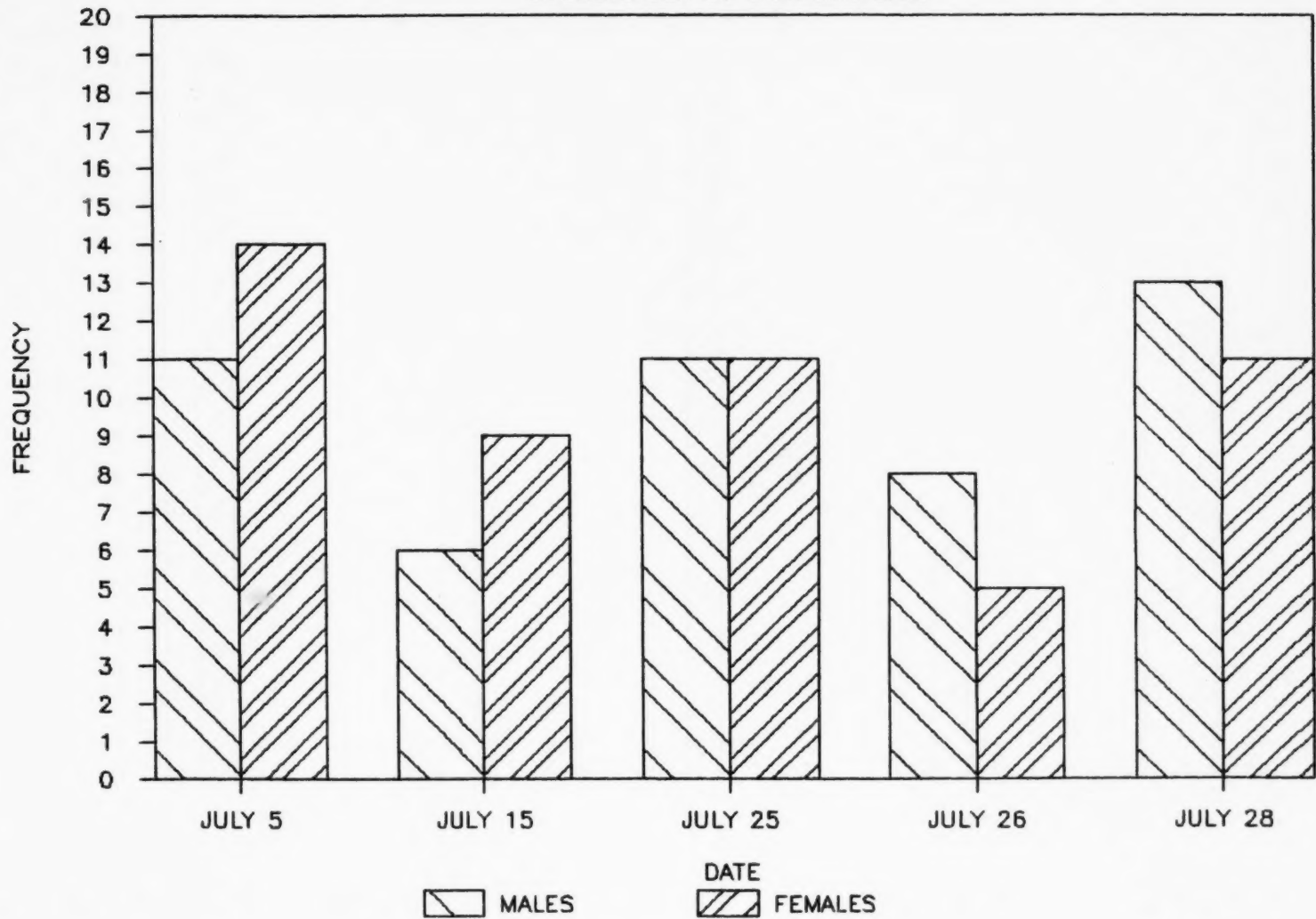
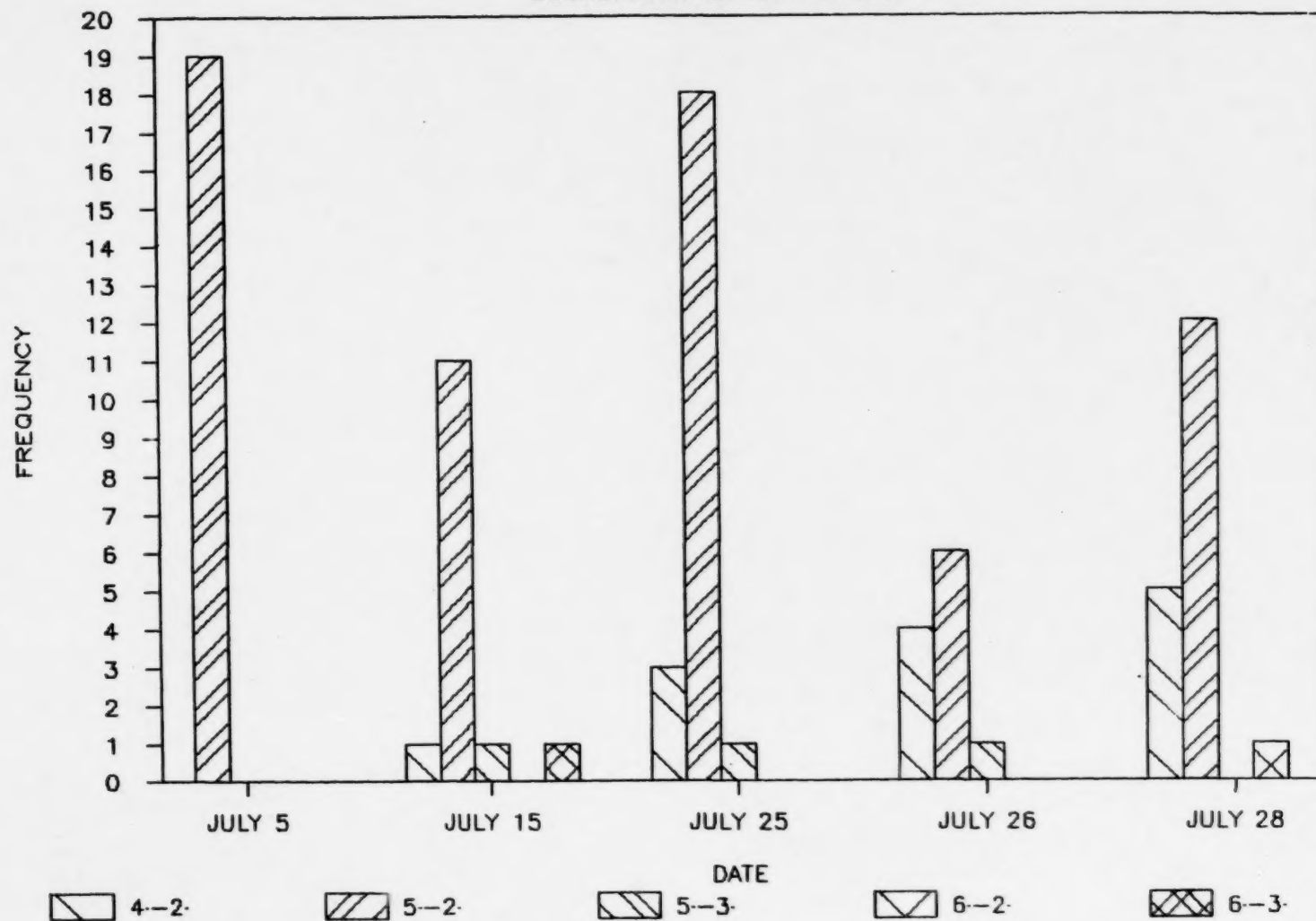


FIGURE 7. 1987 DOCEE RIVER

SOCKEYE AGE BY SAMPLING DATE



At present, in order to fish the traps properly, a person has to be in position on the upper deck of the fence as soon as the aluminum panel is raised to open the trap. Fish move in almost immediately. The trap must then be quickly closed by the person on the upper deck, to prevent the fish from backing out. It is generally assumed that the fish view the trap as an opening that allows them to continue their migration upstream. However once they have entered the trap and discover that their migration is still blocked, they try to back out. After entering the trap once, the fish are generally wary about re-entering the trap. Opening and closing the traps quickly appears to 'trick' the fish into entering the traps.

When the river level is 3'2" (.97 m) at the fence staff gauge, the water is level with the top of the traps. At this height, it takes two (2), sometimes three (3) people to set the traps. The traps have to be pushed and pulled down to the bottom of the frames, using the winch. One (1) or two (2) people have to be astride the top of the trap, using their weight to force the trap through the water and channels to the bottom of the frame. At high water levels, such as this, the visibility within the trap is poor and fish can escape the trap by jumping out and swimming upstream. The traps fish best at lower water flow conditions. Further modifications are going to be tried in the 1988 season to try to make the traps fish more efficiently.

Required Fence Maintenance

Due to ongoing wear and tear on all parts of the fence, the fence preparation takes longer each year. Levelling the river bottom to seat the frames also gets more difficult each year. Root masses drifting down river during the period the fence is in the raised position are scouring the river bottom, shifting large boulders. These have to be moved with a wire strap and pulled out by use of blocks and the All Terrain Vehicle. This is impossible to do from the middle to the far side of the river due to water depth and current. The river seems to be getting deeper on the far side each year, and if this continues, the frames will not hit bottom, rendering the fence unworkable.

All the aluminum panels are in need of welding. The support bars are breaking and more fish are finding their way through the fence panels. At present, expanded metal used to cover these problem areas creates a further problem by catching and killing smolts and other small fish swimming down stream. The expanded metal increases the vibration and water pressure on the fence, causing further breakage of the aluminum support bars and grates. Currently all panels have either been patched with expanded metal or secured using wire. This is only a temporary repair and the support bars and grates should be welded. In addition, the panel frames should be sandblasted, primed and painted to remove the rust build-up and protect them against further weathering.

When raising and lowering the frames with the hydraulic winch, the upper support deck is under great pressure. This deck is rotten in places and if not replaced, will result in an accident that may cause serious injury or death to the winch operator and individuals in the immediate area. The safety rails on the upper deck are also rotten.

The replacement of the safety rails is imperative not only for personal safety but that of the general public. Large numbers of commercial fishermen and tourists visit the fence yearly and lean against these rails when viewing the fence operation.

The small hand winches used to raise the aluminum panels are in poor condition and in need of replacement. The spindles, cables, springs and locking devices are weak due to rust. Also, numerous teeth are broken on the gears. Most of the pulleys on the frames have been broken and should be replaced by a heavier type. In the past, broken pulleys had been replaced by similar but less durable types. However these replacements are not standing up to the pressure and continued use. A small heavy welded pulley with grease fittings would be more efficient.

Required Camp Maintenance

The Docee cabin is in need of repair. There are several structural problems. The back wall is separating from the cabin more each year. At present, there is approximately a 2" (5 cm) gap between the ceiling and wall. The floor joists at the front of the cabin are rotten also. The joists under the porch have been replaced, but replacement of those under the main portion of the cabin require it to be lifted. Inside, the walls require painting and the floor has to be replaced and covered with linoleum.

The electrical wiring throughout the camp requires repair or replacement. The generator often breaks down when operating power tools on the fence and lights concurrently. By replacing the existing wiring with that of a heavier gauge, the amount of power lost due to the distance between the generator and fence would be reduced. In addition, a breaker box should be installed. To discourage the presence of bears in the camp at night, extra lighting is required in the yard and along the path to the fence.

Further repairs have to be done to the trail connecting the skidder road to the camp. This section of the trail passes through heavy forest and is very hard on equipment due to the irregular terrain. The trail needs to be straightened and levelled. Some or all of this will be done in the 1988 season.

APPENDIX I. 1987 Docee fence sockeye samples.

DATE	SEX	LENGTH	AGE	DATE	SEX	LENGTH	AGE	DATE	SEX	LENGTH	AGE
JULY 5	F	54.0	5 ₂	JULY 15	F	48.5	5 ₂	JULY 26	F	50.0	5 ₂
JULY 5	M	50.0	5 ₂	JULY 15	F	50.5	5 ₂	JULY 26	M	46.0	4 ₂
JULY 5	F	51.5	5 ₂	JULY 15	F	54.0	5 ₂	JULY 26	M	52.0	
JULY 5	F	51.5	5 ₂	JULY 15	M	57.0	5 ₂	JULY 26	F	48.5	5 ₂
JULY 5	F	52.0	5 ₂	JULY 15	F	47.0	5 ₃	JULY 26	M	45.0	4 ₂
JULY 5	M	50.5		JULY 15	F	51.0	5 ₂	JULY 26	M	51.5	5 ₂
JULY 5	M	54.5	5 ₂	JULY 25	M	47.0	4 ₂	JULY 26	F	52.0	5 ₂
JULY 5	F	50.5		JULY 25	M	53.0	5 ₂	JULY 28	M	43.0	4 ₂
JULY 5	M	55.0	5 ₂	JULY 25	F	54.0	5 ₂	JULY 28	F	52.5	5 ₂
JULY 5	M	53.5	5 ₂	JULY 25	M	54.5	5 ₂	JULY 28	F	43.0	
JULY 5	F	52.5		JULY 25	M	46.5	4 ₂	JULY 28	M	49.0	
JULY 5	F	53.5	5 ₂	JULY 25	M	42.5	4 ₂	JULY 28	F	50.5	
JULY 5	M	53.5	5 ₂	JULY 25	F	48.5	5 ₂	JULY 28	M	53.5	5 ₂
JULY 5	F	52.1	5 ₂	JULY 25	M	53.0	5 ₂	JULY 28	M	52.0	5 ₂
JULY 5	F	55.9	5 ₂	JULY 25	F	49.5	5 ₂	JULY 28	M	53.0	5 ₂
JULY 5	M	53.0		JULY 25	F	52.5	5 ₂	JULY 28	M	42.5	4 ₂
JULY 5	M	52.0	5 ₂	JULY 25	F	51.5	5 ₂	JULY 28	M	53.0	
JULY 5	F	51.0	5 ₂	JULY 25	M	50.5	5 ₂	JULY 28	F	53.0	5 ₂
JULY 5	M	52.5	5 ₂	JULY 25	F	52.0	5 ₂	JULY 28	F	53.0	
JULY 5	F	49.0	5 ₂	JULY 25	M	45.5	5 ₃	JULY 28	M	46.0	4 ₂
JULY 5	F	52.5	5 ₂	JULY 25	F	51.5	5 ₂	JULY 28	M	43.5	4 ₂
JULY 5	M	53.5		JULY 25	F	52.0	5 ₂	JULY 28	F	50.0	5 ₂
JULY 5	M	52.0	5 ₂	JULY 25	F	47.0	5 ₂	JULY 28	M	48.0	
JULY 5	F	53.0		JULY 25	F	51.5	5 ₂	JULY 28	M	50.5	5 ₂
JULY 5	F	52.0	5 ₂	JULY 25	F	52.0	5 ₂	JULY 28	F	50.0	5 ₂
JULY 15	F	50.0	5 ₂	JULY 25	M	53.5	5 ₂	JULY 28	M	53.0	5 ₂
JULY 15	F	50.5	5 ₂	JULY 25	M	54.0	5 ₂	JULY 28	M	52.5	5 ₂
JULY 15	F	52.5	5 ₂	JULY 25	M	52.0	5 ₂	JULY 28	F	45.5	6 ₂
JULY 15	M	52.0		JULY 26	F	49.5	5 ₂	JULY 28	F	53.0	5 ₂
JULY 15	M	52.5	5 ₂	JULY 26	M	42.5	4 ₂	JULY 28	F	44.0	4 ₂
JULY 15	M	48.0	6 ₃	JULY 26	M	51.0	5 ₂	JULY 28	F	49.0	5 ₂
JULY 15	M	43.5	4 ₂	JULY 26	M	45.0	5 ₃				
JULY 15	M	51.0	5 ₂	JULY 26	F	44.0	4 ₂				
JULY 15	F	51.0	5 ₂	JULY 26	M	53.0					

APPENDIX II. 1987 Smith Inlet tide levels (Bella Bella).

